

west virginia department of environmental protection

Office of Oil and Gas 601 57th Street SE Charleston, WV 25304 (304) 926-0450 (304) 926-0452 fax Earl Ray Tomblin, Governor Randy C. Huffman, Cabinet Secretary www.dep.wv.gov

November 06, 2014

WELL WORK PERMIT

Horizontal 6A Well

This permit, API Well Number: 47-4105694, issued to EQT PRODUCTION COMPANY, is evidence of permission granted to perform the specified well work at the location described on the attached pages and located on the attached plat, subject to the provisions of Chapter 22 of the West Virginia Code of 1931, as amended, and all rules and regulations promulgated thereunder, and to all conditions and provisions outlined in the pages attached hereto. Notification shall be given by the operator to the Oil and Gas Inspector at least 24 hours prior to the construction of roads, locations, and/or pits for any permitted work. In addition, the well operator shall notify the same inspector 24 hours before any actual well work is commenced and prior to running and cementing casing. Spills or emergency discharges must be promptly reported by the operator to 1-800-642-3074 and to the Oil and Gas inspector.

Please be advised that form WR-35, Well Operators Report of Well Work is to be submitted to this office within 90 days completion of permitted well work, as should form WR-34 Discharge Monitoring Report within 30 days of discharge of pits, if applicable. Failure to abide by all statutory and regulatory provisions governing all duties and operations hereunder may result in suspension or revocation of this permit and, in addition, may result in civil and/or criminal penalties being imposed upon the operators.

In addition to the applicable requirements of this permit, and the statutes and rules governing oil and gas activity in WV, this permit may contain specific conditions which must be followed. Permit conditions are attached to this cover letter.

Per 35CSR-4-5.2.g this permit will expire in two (2) years from the issue date unless permitted well work is commenced. If there are any questions, please feel free to contact me at (304) 926-0499 ext. 1654.

James Martin

Chief

Operator's Well No: 514172

Farm Name: HORNER, WILLIAM & MARY ET

API Well Number: 47-4105694

Permit Type: Horizontal 6A Well

Date Issued: 11/06/2014

Promoting a healthy environment.

API Number: 41-05694

PERMIT CONDITIONS

West Virginia Code § 22-6A-8(d) allows the Office of Oil and Gas to place specific conditions upon this permit. Permit conditions have the same effect as law. <u>Failure to adhere to the specified permit conditions may result in enforcement action.</u>

CONDITIONS

- 1. This proposed activity may require permit coverage from the United States Army Corps of Engineers (USACE). Through this permit, you are hereby being advised to consult with USACE regarding this proposed activity.
- 2. If the operator encounters an unanticipated void, or an anticipated void at an unanticipated depth, the operator shall notify the inspector within 24 hours. Modifications to the casing program may be necessary to comply with W. Va. Code § 22-6A-5a (12), which requires drilling to a minimum depth of thirty feet below the bottom of the void, and installing a minimum of twenty (20) feet of casing. Under no circumstance should the operator drill more than fifty (50) feet below the bottom of the void or install less than twenty (20) feet of casing below the bottom of the void.
- 3. When compacting fills, each lift before compaction shall not be more than 12 inches in height, and the moisture content of the fill material shall be within limits as determined by the Standard Proctor Density test of the actual soils used in specific engineered fill, ASTM D698, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort, to achieve 95 % compaction of the optimum density. Each lift shall be tested for compaction, with a minimum of two tests per lift per acre of fill. All test results shall be maintained on site and available for review.
- 4. Operator shall install signage per § 22-6A-8g (6) (B) at all source water locations included in their approved water management plan within 24 hours of water management plan activation.
- 5. Oil and gas water supply wells will be registered with the Office of Oil and Gas and all such wells will be constructed and plugged in accordance with the standards of the Bureau for Public Health set forth in its Legislative rule entitled *Water Well Regulations*, 64 C.S.R. 19. Operator is to contact the Bureau of Public Health regarding permit requirements. In lieu of plugging, the operator may transfer the well to the surface owner upon agreement of the parties. All drinking water wells within fifteen hundred feet of the water supply well shall be flow tested by the operator upon request of the drinking well owner prior to operating the water supply well.
- 6. Pursuant to the requirements pertaining to the sampling of domestic water supply wells/springs the operator shall, no later than thirty (30) days after receipt of analytical data provide a written copy to the Chief and any of the users who may have requested such analyses.
- 7. If any explosion or other accident causing loss of life or serious personal injury occurs in or about a well or well work on a well, the well operator or its contractor shall give notice, stating the particulars of the explosion or accident, to the oil and gas inspector and the Chief, within 24 hours of said accident.
- 8. During the casing and cementing process, in the event cement does not return to the surface, the oil and gas inspector shall be notified within 24 hours.
- 9. Operator shall provide the Office of Oil & Gas notification of the date that drilling commenced on this well. Such notice shall be provided by sending an email to DEPOOGNotify@wv.gov within 30 days of commencement of drilling.

4704105694

STATE OF WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS W.VA. CODE \$22-6A - WELL WORK PERMIT APPLICATION

1) Well Operator: EQT Produ	ction Company			041	2	542
			Operator ID	County	District	Quadrangle
2) Operator's Well Number:		514172		_Well Pad Nam	ne:	PET35
3) Farm Name/Surface Owner :	William	& Mary Ho	orner et al	_ Public Road A	ccess:	Rt 17
4) Elevation, current ground:	1,158.0	Eleva	ation, proposed p	ost-construction	:1,15	55.8
5) Well Type: (a) Gas	Oil	U.	nderground Stora	age		
Other						
(b) If Gas:	Shallow	1	Deep			SA
	Horizontal	•				9/2
6) Existing Pad? Yes or No:	no					
Proposed Target Formation(s						
Target formation is Marcel	lus at a depth of 7446	with the ant	icipated thickness to	be 64 feet and antic	ipated target pre	essure of 3109 PSI
8) Proposed Total Vertical Depth)·			7,446		
Formation at Total Vertical De				Marcellus		
0) Proposed Total Measured D				17,484		
(1) Proposed Horizontal Leg Lei				8,074		
(2) Approximate Fresh Water St	trata Depths:			131, 195, 263	, 313	
3) Method to Determine Fresh	Water Depth:			By offset we	ells	
(4) Approximate Saltwater Depti	hs:			n/a		
15) Approximate Coal Seam Dep				260, 674, 899, 1	041, 1109	
16) Approximate Depth to Possil		e, karst, o	ther):		None re	eported
17)Does proposed well location						
adjacent to an active mine?						
(a) If Yes, provide Mine Info:	Name:					
	D 11					
	Seam:					
	Owner:					

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Received

SEP 2 9 2014

Office of Oil and Gas WV Dept. of Environmental Protection



August 13, 2014

Mr. Gene Smith West Virginia Department of Environmental Protection Office of Oil and Gas 601 57th Street SE Charleston, WV 25304

Re: Casing on Wells 514167, 514168, 514169, 514170, 514171, 514172 (PET35)

Dear Mr. Smith,

EQT is requesting the 13-3/8" surface casing be set at 939' KB, 50' below a red rock formation. This will cover up red rock formations that have given EQT drilling issues in the past. We will set the 9-5/8" intermediate string at 3189' KB, 50' below the porosity zone in the Bayard formation.

If you have any questions, please do not hesitate to contact me at (304) 848-0076.

Sincerely,

Vicki Roark

Permitting Supervisor

Enc.

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WW - 6B (3/13)

CASING AND TUBING PROGRAM

18)

18)				(FOOTAGE	INTERVALO	CEMENT:
TYPE	<u>Size</u>	New	Grade	Weight per	FOOTAGE:	INTERVALS:	The second secon
		<u>or</u>		<u>ft.</u>	for Drilling	Left in Well	Fill- up (Cu.Ft.)
		Used					
Conductor	20	New	MC-50	81	40	40	38 C.T.S.
Fresh Water	13 3/8	New	MC-50	54	939	939	817 C.T.S.
Coal							
Intermediate	9 5/8	New	MC-50	40	3,189	3,189	1,248 C.T.S.
Production	5 1/2	New	P-110	20	17,484	17,484	See Note 1
Tubing	2 3/8		J-55	4.6			May not be run, if run will be set 100' less than TD
Liners							

5	DW
9	124/2014

TYPE	Size	Wellbore Diameter	Wall Thickness	Burst Pressure	<u>Cement</u> <u>Type</u>	Cement Yield (cu. ft./k)
Conductor	20	24	0.375		Construction	1.18
Fresh Water	13 3/8	17 1/2	0.38	2,480	* See Note 2	1.21
Coal						
Intermediate	9 5/8	12 3/8	0.395	3,590	* See Note 2	1.21
Production	5 1/2	8 1/2	0.361	12,640	-	1.27/1.86
Tubing						
Liners						

<u>Packers</u>

Kind:	N/A	
Sizes:	N/A	
Depths Set:	N/A	

Note 1: EQT plans to bring the TOC on the production casing cement job 1,000' above kick off point, which is at least 500' above the shallowest production zone, to avoid communication.

Note 2: Reference Variance 2014-17.

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Office of Oil and Gas WV Dept. of Environmental Protection Well Schematic EQT Production

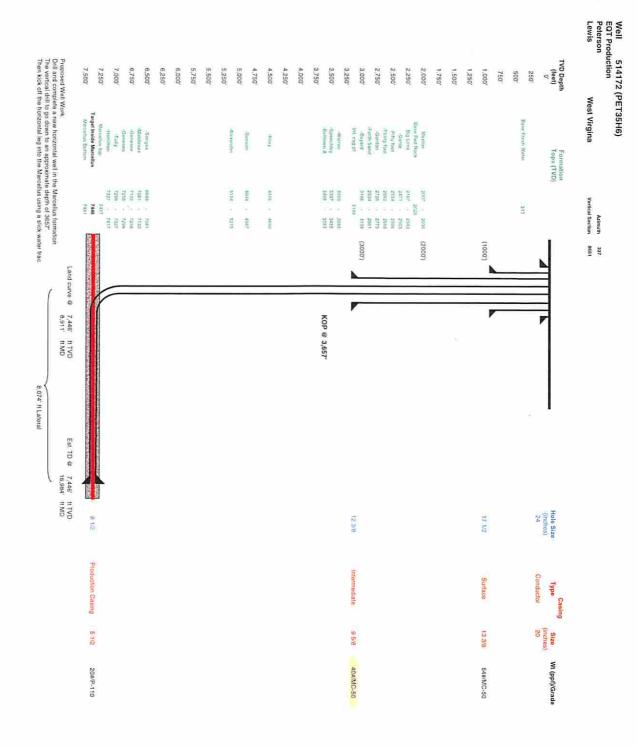
8,000' -

Well Name 514172 (PET35H6) Elevation KB: Target Prospect Azimuth Lewis West Virgina Vertical Section 0' -7 Δ Hole Size 24" - 20" Conductor at 40" Bit Size 17.5* 313' Fresh Water Base 500' -- 500' TOC @ Surface 13 3/8", MC-50, 54.5# @ 939' ft MD 1,000' -- 1,000 Bit Size 12.375* 1.500' -— 1.500° 2,000' — 2,007' Maxton 2,028' Base Red Rock - 2,000 2,167' Big Lime 2,500' — 2,471' -Gantz 2,554' -Fifty foot 2,662' -Thirty foot - 2,500' 2,726' -Gordon 2,834' -Forth Sand 3,000' — 3,106' -Bayard **—** 3,000° TOC @ Surface 3,189' Int. csg pt Δ 9 5/8", MC-50, 40# @ 3,189' ft MD Bit Size 8.5" 3,500' - 3,359' -Warren 3,397' -Speechley 3,498' -Balltown A — 3.500° KOP = 3,657' ft MD 10 Deg DLS 4.000' -- 4,000 4,500' — _{4,556'} -Riley **-** 4,500' 5.000' — 4,944' -Benson **—** 5,000' 5,154' -Alexander 5,500' — **—** 5,500° **—** 6,000° 6,500' — — 6,500° 6,699' -Sonyea 7,000' — 7,081' -Middlesex **-** 7.000° 7,133' -Genesee Land @ 8,911' ft MD 7,258 -Geneseo 7,446' ft TVD 7,299 -Tully 7,327' -Hamilton 7,417' -Marcellus 5 1/2", P-110, 20# 16,984' ft MD 7,500' — 7,417 Onondaga 7,446' ft TVD — 7.500°

— 8,000'

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*Note: Attach additional sheets as needed.

19) Describe proposed well work, including the drilling and plugging back of any pliot hole.				
Drill and complete a new horizontal well in the marcellus formation. The vertical drill to go down to an approximate depth of 3657				
then kick off the horizontal leg into the marcellus using a slick water frac.				
20) Describe fracturing/stimulating methods in detail, including anticipated max pressure and max rate:				
Hydraulic fracturing is completed in accordance with state regulations using water recycled from previously fractured wells and obtained from				
freshwater sources. This water is mixed with sand and a small percentage (less than 0.3%) of chemicals (including 15% Hydrochloric acid, gelling agent, gel breaker, friction reducer, blocide, and scale inhibitor), referred to in the industry as a "slickwater" completion. Maximum				
anticipated treating pressures are expected to average approximately 8500 psi, maximum anticipated treating rates are expected to average				
approximately 100 bpm. Stage lengths vary from 150 to 300 feet. Average approximately 200,000 barrels of water per stage. Sand sizes				
vary from 100 mesh to 20/40 mesh. Average approximately 200,000 pounds of sand per stage.				
21) Total area to be disturbed, including roads, stockpile area, pits, etc, (acres): 29.19				
22) Area to be disturbed for well pad only, less access road (acres): 20.96				
23) Describe centralizer placement for each casing string.				
 Surface: Bow spring centralizers – One at the shoe and one spaced every 500'. Intermediate: Bow spring centralizers – One cent at the shoe and one spaced every 500'. 				
Production: One spaced every 1000' from KOP to Int csg shoe				
24) Describe all cement additives associated with each cement type. Surface (Type 1 Cement): 0-3% Calcium Chloride				
Used to speed the setting of cement slurries.				
0.4% flake. Loss Circulation Material (LCM) is used to combat the loss of the cement slurry to a thief zone.				
Intermediate (Type 1 Cement): 0-3% Calcium Chloride. Salt is used in shallow, low temperature formations to speed the setting of cement slurries. 0.4% flake. Loss Circulation Material (LCM) is used to combat the loss of whole drilling fluid or cement slurry (not filtrate)				
to a thief zone.				
Production:				
Lead (Type 1 Cement): 0.2-0.7% Lignosulfonate (Retarder). Lengthens thickening time.				
0.3% CFR (dispersant). Makes cement easier to mix.				
Tail (Type H Cement): 0.25-0.40% Lignosulfonate (Retarder). Lengthens thickening time.				
0.2-0.3% CFR (dispersant). This is to make the cement easier to mix.				
60 % Calcuim Carbonate. Acid solubility.				
0.4-0.6% Halad (fluid loss). Reduces amount of water lost to formation.				
25) Proposed borehole conditioning procedures. <u>Surface</u> : Circulate hole clean (Approximately 30-45 minutes) rotating & reciprocating				
one full joint until cuttings diminish at surface. When cuttings returning to surface diminish, continue to circulate an additional 5				
minutes. To ensure that there is no fill, short trip two stands with no circulation. If there is fill, bring compressors back on				
and circulate hole clean. A constant rate of higher than expected cuttings volume likely indicates washouts that will not clean up.				
Intermediate: Circulate hole clean (Approximately 30-45 minutes) rotating & reciprocating one full joint until cuttings diminish at				
surface. When cuttings returning to surface diminish, continue to circulate an additional 5 minutes. If foam drilling, to enhance				
hole cleaning use a soap sweep or increase injection rate & foam concentration.				
Production: Pump marker sweep with nut plug to determine actual hole washout. Calculate a gauge holes bottoms up volume.				
Perform a cleanup cycle by pumping 3-5 bottoms up or until the shakers are clean. Check volume of cuttings coming across				
the shakers every 15 minutes.				

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WW-9 (5/13)

P	age	of	
API No. 47	041		0
Operator's We	ell No.		514172

STATE OF WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS

Fluids/Cuttings Disposal & Reclamation Plan

Operator Name	EQT Production Co.	c	P Code		
Watershed (HUC10)	Sand Fork	Quadra	ngle	Peterson	
Elevation115	5.8 County	Lewis	District	Court House	
Do you anticipate using mo	re than 5,000 bbls of water t	o complete the prop	oosed well work		
Will a pit be used ? Yes:	No:			SDW	2014
Will a synthetic liner		No	X If so, w	hat ml.?60)
Proposed Disposa	I Method For Treated Pit Wa Land Application Underground Injection Reuse (at API Number Off Site Disposal (Sup Other (Explain	(UIC Permit Num			<u>)</u> _)
Will closed loop system be				the drilling	e:
fluid. The drill cuttings are the	en prepared for transportation t	o an off-site disposal	facility.		x
Drilling medium anticipate	d for this well? Air, freshwat	er oil based etc.	Air is used to drill the top-	hole sections of the wellborn	е.
Drilling medium amicipate	d for this won'r rai, neorital	01, 011 00000, 010.		Pilot hole sections, water t	
			mud is used to drill the cur	rve and lateral.	
If oil based, wha	t type? Synthetic, petroleum	, etc			
Additives to be used in drilling		scosifer, Alkalinity Contr	ol, Lime, Chloride S	alts,Rate Filtration Co	ontrol,
	t, Defoaming, Walnut Shell, X-Cide				
generally used when drilling on air					
viscosifer, alkalinity control, lime, o	chloride salts, rate filtration control,	deflocculant, lubricant,	detergent, defoaming	ng, walnut shell,	
x-cide, SOLTEX terra					
Drill cuttings disposal meth	od? Leave in pit, landfill, rer	noved offsite, etc.	l	_andfill	
	n to solidify what medium will be us			n/a	
- Landfill or offsite r	name/permit number?	Se	ee Attached List		-
on August 1, 2005, by the Office of provisions of the permit are enforced or regulation can lead to enforcem I certify under penalty of law application form and all attachment the information, I believe that the issubmitting false information, include Company Official Signature Company Official (Typed National Company Official Company Official (Typed National Company Official (Typed National Company Official (Typed National Company Official Company Official (Typed National Company Official Company Of	eable by law. Violations of any terrent action. If that I have personally examined a state thereto and that, based on my information is true, accurate, and cuting the possibility of fine or imprisi	Department of Environm n or condition of the ger and am familiar with the nquiry of those individua omplete. I am aware the	nental Protection. I uneral permit and/or of information submitted in immediately respect there are significant protection.	inderstand that the other applicable law ed on this consible for obtaining	
Company Official Title		remitting Supe	V1301		
Subscribed and sworn befo	re me this	day of <u>Aus</u>		, 20 <u>//</u>	
- Tanke &	1 pt				Olive
My commission expires		8.24.22		1100	eive



SEP 29 214

EQT Production Water plan Offsite disposals for Marcellus wells

CWS TRUCKING INC.

P.O. Box 391 Williamstown, WV 26187 740-516-3586 Noble County/Noble Township Permit # 3390

LAD LIQUID ASSETS DISPOSAL INC.

226 Rankin Road Washington, PA 15301 724-350-2760 724-222-6080 724-229-7034 fax Ohio County/Wheeling Permit # USEPA WV 0014

TRI COUNTY WASTE WATER MANAGEMENT, INC.

1487 Toms Run Road Holbrook, PA 15341 724-627-7178 Plant 724-499-5647 Office Greene County/Waynesburg Permit # TC-1009

Waste Management - Meadowfill Landfill

Rt. 2, Box 68 Dawson Drive Bridgeport, WV 26330 304-326-6027 Permit #SWF-1032-98 Approval #100785WV

Waste Management - Northwestern Landfill

512 E. Dry Road Parkersburg, WV 26104 304-428-0602 Permit #SWF-1025 WV-0109400 Approval #100833WV

BROAD STREET ENERGY LLC

37 West Broad Street Suite 1100 Columbus, Ohio 43215 740-516-5381 Washington County/Belpre Twp. Permit # 8462

TRIAD ENERGY

P.O. Box 430
Reno, OH 45773
740-516-6021 Well
740-374-2940 Reno Office Jennifer
Nobel County/Jackson Township
Permit # 4037

KING EXCAVATING CO.

Advanced Waste Services 101 River Park Drive New Castle, Pa. 16101 Facility Permit# PAR000029132

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	Operator's Well No. 514172
Proposed Revegetation Treatment: Acres Disturbed29.19	Prevegetation pH
Lime3 Tons/acre or to correct to pH	6.5
Fertilize type	
Fertilizer Amount 1/3 lbs/acre (500 lbs m	linimum)
Mulch 2 Tons/	acre
Seed Mixtures	
	Permanent eed Type lbs/acre rd Grass 15
Alsike Clover 5 Alsike	Clover 5
Annual Rye 15	
Photocopied section of involved 7.5' topographic sheet.	
Comments: Pre-seed/Mulch all disturbed of	reas as Soon as reasonabl
per WV DEP EX Suanual.	Ets as nepessary
Title Oil & Gas Inspector Date:	3/24/2014
Field Reviewed? () Yes () No Receive

SEP 29 214



Site Specific Safety Plan

EQT PET 35 Pad

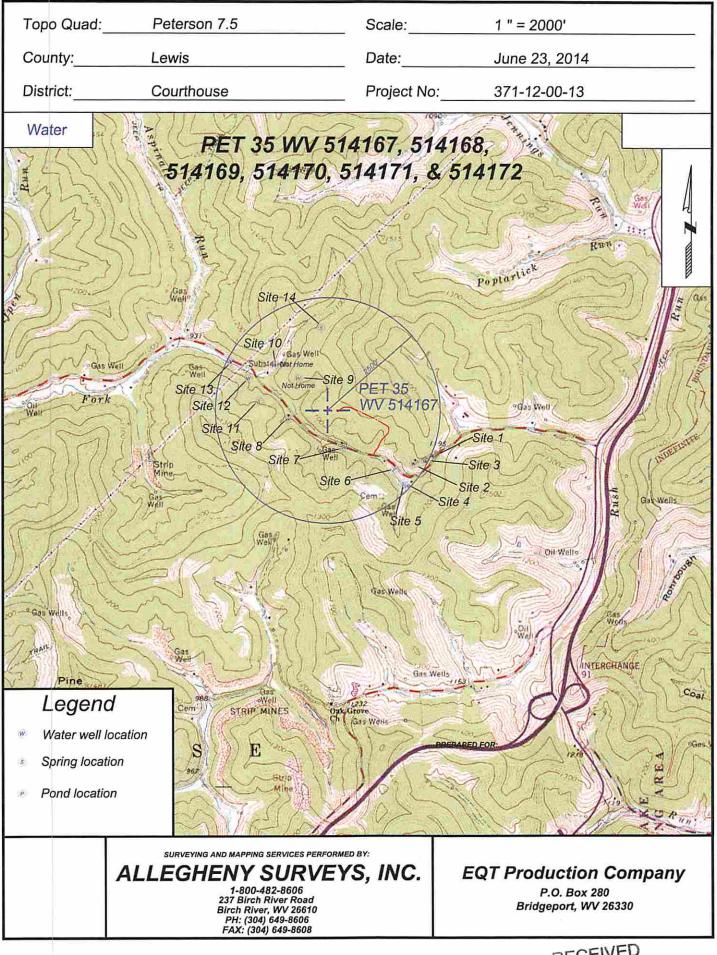
Peterson

Lewis County, WV

51416751416851	For Wells: 4169514170	514171514172
	Date Prepared:	June 30, 2014
EQT Production		WV Oil and Gas Inspector
Dopunitting Speak	NSOV	Title
Date 8-/3-/7	Received	Date
	SEP 2 9 114	SDW 9/2014

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